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SERIAL NUMBER	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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08/401,473 03/09/95 PIPPIN

J 42390.P1674D

EXAMINER *RO*

BOM1/0119

ART UNIT PAPER NUMBER

2304

DATE MAILED: 01/19/96

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This is a communication from the examiner in charge of your application.  
COMMISSIONER OF PATENTS AND TRADEMARKS

☐ This application has been examined ☒ Responsive to communication filed on OCT. 10, 1995 ☒ This action is made final.

A shortened statutory period for response to this action is set to expire 3 month(s), 0 days from the date of this letter.  
Failure to respond within the period for response will cause the application to become abandoned. 35 U.S.C. 133

**Part I THE FOLLOWING ATTACHMENT(S) ARE PART OF THIS ACTION:**

- |   |   |
|---|---|
| 1. <input checked="" type="checkbox"/> Notice of References Cited by Examiner, PTO-892. | 2. <input type="checkbox"/> Notice of Draftsman's Patent Drawing Review, PTO-948. |
| 3. <input checked="" type="checkbox"/> Notice of Art Cited by Applicant, PTO-1449.      | 4. <input type="checkbox"/> Notice of Informal Patent Application, PTO-152.       |
| 5. <input type="checkbox"/> Information on How to Effect Drawing Changes, PTO-1474.     | 6. <input type="checkbox"/>   |

**Part II SUMMARY OF ACTION**

1. ☒ Claims 1-35 are pending in the application.  
Of the above, claims \_\_\_\_\_ are withdrawn from consideration.
2. ☐ Claims 1-19 have been cancelled.
3. ☐ Claims \_\_\_\_\_ are allowed.
4. ☒ Claims 20-35 are rejected.
5. ☐ Claims \_\_\_\_\_ are objected to.
6. ☐ Claims \_\_\_\_\_ are subject to restriction or election requirement.
7. ☐ This application has been filed with informal drawings under 37 C.F.R. 1.85 which are acceptable for examination purposes.
8. ☐ Formal drawings are required in response to this Office action.
9. ☐ The corrected or substitute drawings have been received on \_\_\_\_\_. Under 37 C.F.R. 1.84 these drawings are ☐ acceptable; ☐ not acceptable (see explanation or Notice of Draftsman's Patent Drawing Review, PTO-948).
10. ☐ The proposed additional or substitute sheet(s) of drawings, filed on \_\_\_\_\_, has (have) been ☐ approved by the examiner; ☐ disapproved by the examiner (see explanation).
11. ☐ The proposed drawing correction, filed \_\_\_\_\_, has been ☐ approved; ☐ disapproved (see explanation).
12. ☐ Acknowledgement is made of the claim for priority under 35 U.S.C. 119. The certified copy has ☐ been received ☐ not been received  
☐ been filed in parent application, serial no. \_\_\_\_\_; filed on \_\_\_\_\_.
13. ☐ Since this application appears to be in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under Ex parte Quayle, 1935 C.D. 11; 453 O.G. 213.
14. ☐ Other

**EXAMINER'S ACTION**

1. This office action responds to the amendment filed on Oct. 10, 1995. Claims 1-19 have been cancelled. Claims 20-35 are presented for examination.

2. Applicant's arguments filed on Oct. 10, 1995 have been fully considered but they are not deemed to be persuasive.

3. Claims 20-35 are rejected under 35 U.S.C. § 103 as being unpatentable over Giordano et al. Pat. No. 5,359,236 in view of Kenny et al. Pat. No. 5,287,292.

As per claims 20-35, Giordano et al. disclose an integrated circuit thermal sensor. As shown in Fig. 1A, a portion of a band gap voltage  $KV_{bg}$  is applied between the base and emitter of a bipolar transistor Q1, also referred to as the controlled device. Generally, the band gap voltage applied to the base of Q1 is held at a relatively fixed value as a function of temperature, as shown in Fig. 1B. Temperature sensing is achieved by relying on the well known principle that the base-emitter voltage of a bipolar transistor decreases at a predetermined rate as shown in Fig. 1B. Accordingly, Giordano et al. disclose circuits embodying the invention include a means for generating a turn-on signal which increases with increasing temperature. As shown in Figs. 2 and 4, the section 41 includes a current source 13 connected between a first power terminal 12 to which is applied an operating potential of  $V_{cc}$  volts and a node 15. Current  $I_1$  is produced by the current

source 13. The current generator comprised of transistor Q2 through Q5 and resistor R1 produces a current IB which is directly proportional to temperature T and inversely proportional to resistor R1. Current IC is very much proportional to IB. V14, which is the control voltage applied to the base of Q1, is purely proportional to temperature variations, increasing directly and linearly with increasing temperature (Col. 5, lines 1-27). As the temperature increases and a critical temperature value is reached, Q1 begins to conduct. The conduction of Q1 is accelerated by the combination of the delta VBE and VBE signals. The current sink and current source at section 43 sets flip-flop 40, causing its output 04 to go high and initiating the shutdown of power to the integrated circuit on which the thermal sensor is formed. However, Giordano et al. do not call for using thermal sensing devices in an integrated circuit such as a microprocessor. Such feature is, however, old and well-known in the art. In fact, Kenny et al. disclose a heat regulator for integrated circuits. As cited in the background of the invention, the temperature of a CMOS integrated circuit (CPU) depends on the power used by the integrated circuit which is proportional to the clock speed or frequency of operation of the IC. Prior art power control schemes can change clock speed and therefore change circuit temperature. Kenny et al. disclose a method for regulating IC temperature. The method includes a step of sensing IC temperature and whenever the threshold is reached, the CPU clock speed is slowed (see summary of the invention).

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Thus, with the motivation of automatically controlling heat generated integrated circuits especially for microprocessor devices, practitioners in the art would have found it obvious to combine the teachings of Giordano et al. and Kenny et al.

**Response to the remarks**

Response to the remarks about the cited prior art failing to disclose processing means for executing a plurality of instructions, said instructions including instructions for generating a value representative of a threshold temperature for the microprocessor, the examiner disagrees. Kenny disclose heat regulator for integrated circuits. Kenny suggest generated heat is monitored by a conventional temperature monitor (see Col. 1, summary of the invention). Kenny use clock frequency as a parameter for regulating temperature inside the microprocessor. The system uses programmable power use as a threshold temperature set and regulation delay (see Col. 4, lines 4-15). It does inherently imply the processor executes threshold temperature. Or in other words, the threshold temperature is preprogrammed. Of course, the programmed value must be stored in a storage means for comparison as known in the art.

Response to the remarks about triggering interrupt, interrupt handling and display, Kenny disclose trigger circuit for interrupting device operation (see Fig. 4, for example). Kenny also disclose interrupt handling mechanism to low temperature (see Figs. 2 and Fig. 4). And finally, temperature display is well-known in the art.

4. The prior art made of record and not relied upon is considered pertinent to applicant.

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[1]	4,799,176	Cacciatore	Jan. 17, 1989
[2]	5,046,296	Huijsing et al.	Nov. 12, 1991
[3]	5,105,366	Beckey	Apr. 14, 1992
[4]	5,453,682	Hinrichs et al.	Sept. 26, 1995

5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 C.F.R. § 1.136(a).


A SHORTENED STATUTORY PERIOD FOR RESPONSE TO THIS FINAL ACTION IS SET TO EXPIRE THREE MONTHS FROM THE DATE OF THIS ACTION. IN THE EVENT A FIRST RESPONSE IS FILED WITHIN TWO MONTHS OF THE MAILING DATE OF THIS FINAL ACTION AND THE ADVISORY ACTION IS NOT MAILED UNTIL AFTER THE END OF THE THREE-MONTH SHORTENED STATUTORY PERIOD, THEN THE SHORTENED STATUTORY PERIOD WILL EXPIRE ON THE DATE THE ADVISORY ACTION IS MAILED, AND ANY EXTENSION FEE PURSUANT TO 37 C.F.R. § 1.136(a) WILL BE CALCULATED FROM THE MAILING DATE OF THE ADVISORY ACTION. IN NO EVENT WILL THE STATUTORY PERIOD FOR RESPONSE EXPIRE LATER THAN SIX MONTHS FROM THE DATE OF THIS FINAL ACTION.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thai Phan whose telephone number is (703)305-3812.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist, whose telephone number is (703)305-3800.

Fax communications can be received at (703)305-9724. It is suggested that examiner be informed prior to transmission.

T.P.  
Thai Phan  
Jan. 06, 1996

  
VINCENT N. TRANS  
PRIMARY EXAMINER  
GROUP 2300